Radiological Terrorism and Commercial Radioactive Sources

Commercial Radioactive Sources:
Surveying the Security Risks

March 3, 2003

Charles D. Ferguson, Ph.D.
Scientist-in-Residence
Center for Nonproliferation Studies
Monterey Institute of International Studies

Supported by the John D. and Catherine T. MacArthur Foundation and the Ploughshares Fund

Scope of this report

Focusing on the security of *commercial radioactive sources:*

- a significant category of radioactive materials that are used widely throughout the world
- until recently, these materials have not been considered high security risks

High-Risk Materials?

HIGH RISK

LOW RISK

High-Risk Materials *(cont'd)*

- **Finding:** Only a small fraction of commercial radioactive sources pose inherently high security risks

- **High-risk sources are:**
  - Portable
  - Dispersible
  - More radioactive

High-Risk Radioactive Source Examples

Radiography Sources

Radioisotope Thermoelectric Generators (RTGs)

Mobile Cesium Irradiators

High-Risk Materials *(cont'd)*

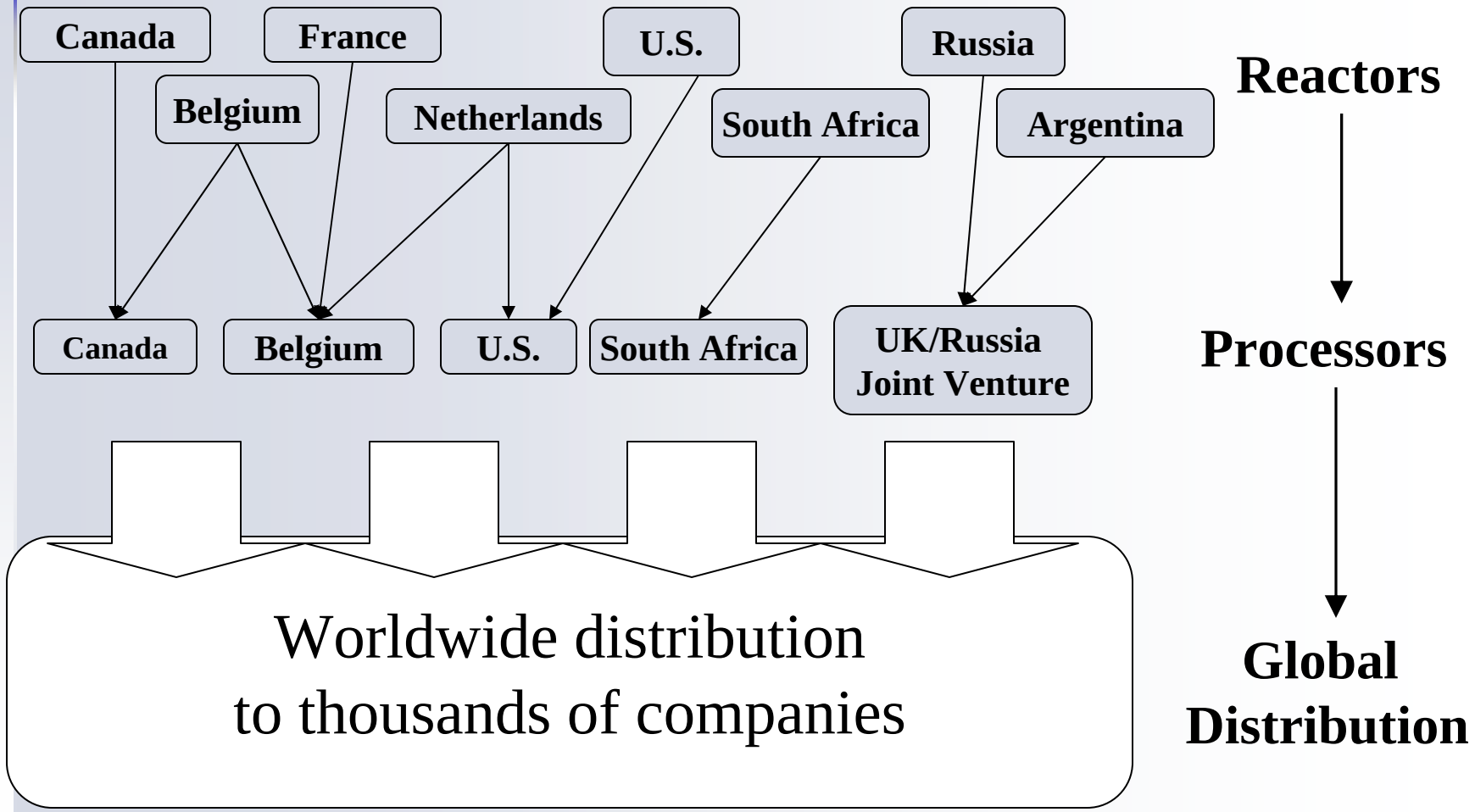
Only 7 reactor-produced radioisotopes present high security concern:

- ***Internal Health Hazard Only:***
  - americium-241
  - californium-252
  - plutonium-238
- ***Internal <u>and</u> External Health Hazards:***
  - cesium-137
  - cobalt-60
  - iridium-192
  - strontium-90

High-Risk Materials *(cont'd)*

- **Finding:** Only a few corporations in a handful of nations produce most of the high-risk commercial radioactive sources.
  - This small group then distributes radioactive sources to tens of thousands of users throughout the world

The Radioisotope Industry



U.S Security Arrangements for Radioactive Sources of High Concern

Activity	Security Arrangements
Source Production and Processing	Government-required standard reactor security measures
Source and Equipment Transportation	NRC advisory/inspections and Industrial security practices
End-user	NRC advisory/inspections and Industrial security practices
Storage/Disposal	NRC regulations and/or DOE regulations

Major Areas of Concern

1. “Disused” Sources
2. “Orphaned” Sources
3. Regulatory Controls in FSU and Developing Countries
4. U.S. Export Licensing Rules

1. “Disused” Sources

- Bad News:
  - Large numbers
  - Vulnerable to theft, diversion
  - Potential safety hazard
  - Could become ‘orphaned’
  - Inadequate disposal facilities

- Good News: ”Disused” sources are largely accounted for

2. "Orphaned" Sources

- Bad News: Many Thousands of High-Risk Sources
  - Result of:
    - High disposal costs
    - Lack of adequate depositories
  - Most in FSU – terrorist and illicit trafficking activities cause concern
- Good News: Ongoing programs, e.g., IAEA, U.S., and Russia efforts focused on FSU

3. Regulatory Controls in FSU and Developing Countries

- Bad News: Regulatory controls are weak or non-existent – *about half the world's nations*

- Good News: Number of high-risk sources outside the FSU is limited

  → Concentrate security efforts on FSU

4. U.S. Export Licensing Rules

- Bad News: Rules are currently inadequate to prevent illicit commerce
  - Unlimited, unregulated exports of high-risk sources to most destinations including Syria
  - *Exceptions*: Cuba, Iran, Iraq, Libya, North Korea, and Sudan are embargoed but no measures to prevent transshipments.
- Good News: Regulatory measures could be implemented quickly if given priority

Strengthening the Radioactive Source Security System

Recommendations:

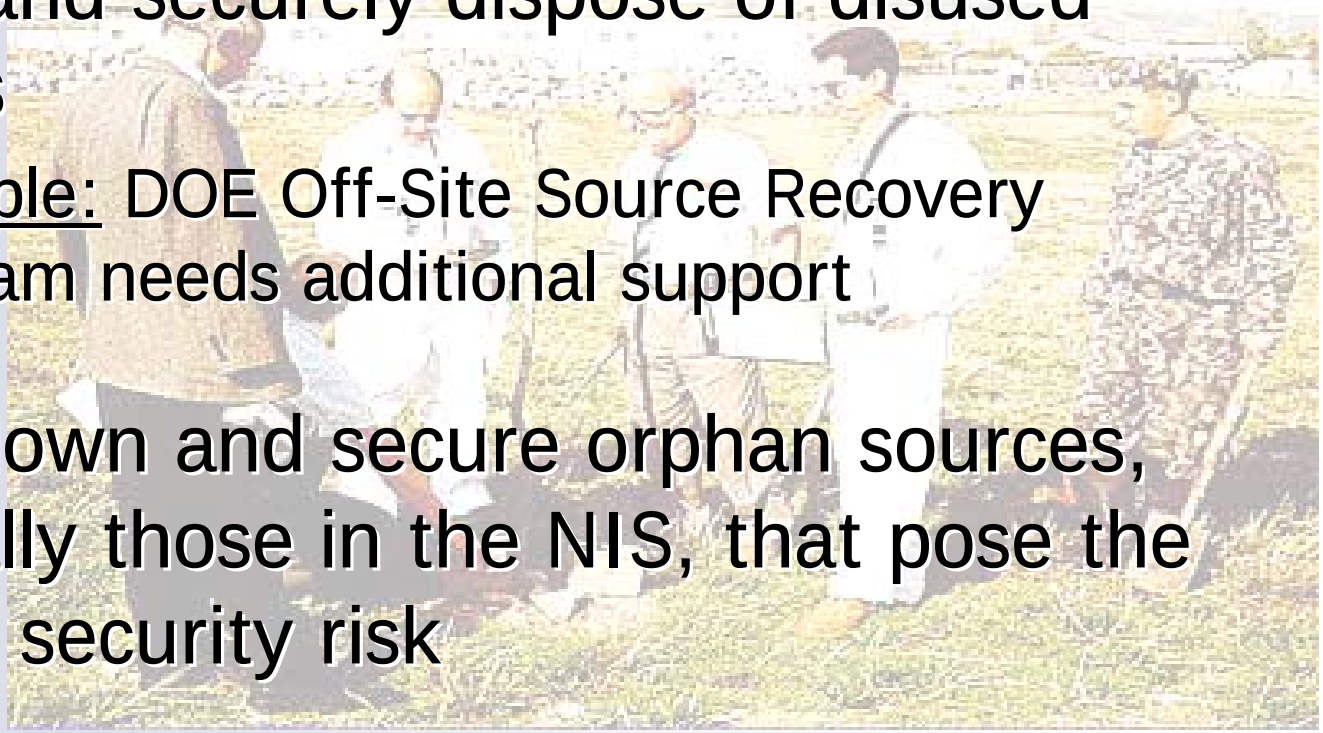
1. Implement Source Controls
2. Establish Regulatory Measures
3. Manage Security Risks
4. Prepare for RDD Attack

Strengthening the Radioactive Source Security System

1. SOURCE CONTROLS

a) Safely and securely dispose of disused sources
   - Example: DOE Off-Site Source Recovery Program needs additional support

b) Track down and secure orphan sources, especially those in the NIS, that pose the highest security risk



Strengthening the Radioactive Source Security System

2. REGULATORY MEASURES

a) Assist nations with weak or essentially nonexistent regulatory controls (buttress IAEA assistance programs)

b) Protect against illicit commerce in radioactive sources

c) Implement improved U.S. export licensing rules

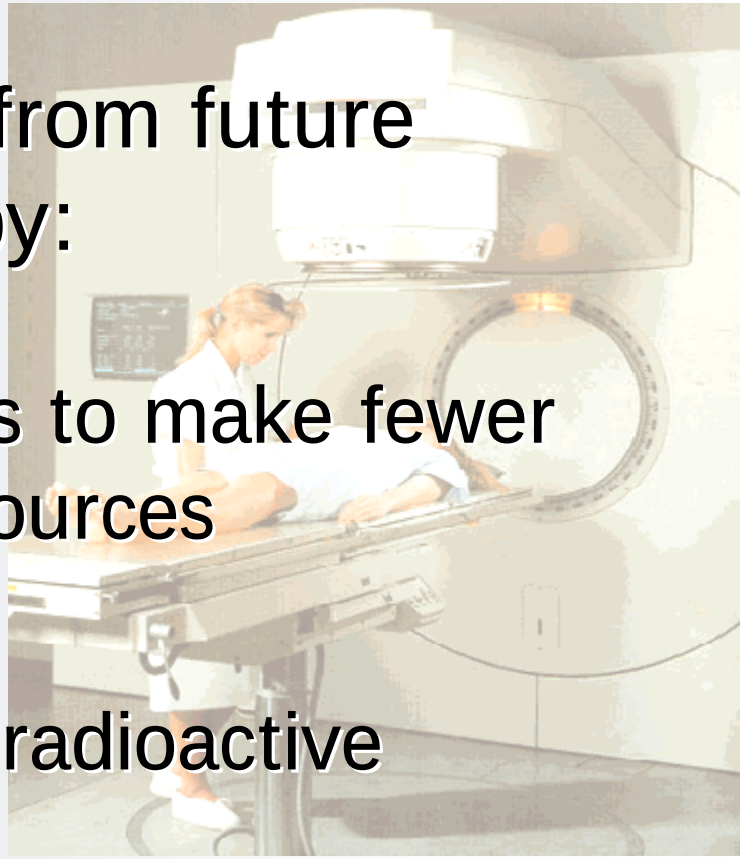
Strengthening the Radioactive Source Security System

3. MANAGE SECURITY RISKS

Decrease security risks from future radioactive sources by:

a) Encouraging producers to make fewer high-risk radioactive sources

b) Promoting use of non-radioactive alternatives



Strengthening the Radioactive Source Security System

4. PREPARE FOR RDD ATTACK

a) Educate the public, the press, and political leadership

b) Equip and train first responders

c) Conduct planning exercises